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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,255	08/20/2003	Mark Cullen	CULLN-001B	6075

7590 09/15/2009

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ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
09/15/2009	PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARK CULLEN

Appeal 2008-006125
Application 10/644,255
Technology Center 1700

Decided: September 15, 2009

Before PETER F. KRATZ, JEFFERY T. SMITH and
MICHAEL P. COLAIANNI, Administrative *Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant seeks review under 35 U.S.C. § 134 from the Examiner's rejections of claims 40-88 in the second non-final Office Action dated September 8, 2006 (App. Br. 1). This Board has jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

STATEMENT OF THE CASE

The invention of the present application under review is directed to a method or process of treatment of crude oil fractions and fossil fuels. Claim 40 is illustrative and reproduced below:

> 40. A process for upgrading a crude oil fraction to improve the performance and enhance the utility of the crude oil fraction, said process comprising the step of heating said crude oil fraction in the presence of an oxidizing agent while exposing said crude oil fraction to sonic energy in the absence of an aqueous phase.

The Examiner relies on the following prior art as evidence of unpatentability of the claims under review:

Inoue	3,616,375	Oct. 26, 1971
Gunnerman	6,500,219	Dec. 31, 2002

The Examiner maintains the following rejections of the pending claims:

1. Claims 40-57 stand rejected under 35 U.S.C. § 103(a) as obvious over Gunnerman.

2. Claims 58-75 stand rejected under 35 U.S.C. § 103(a) as obvious over Gunnerman.

3. Claims 76-88[1] stand rejected under 35 U.S.C. § 103(a) as obvious over Gunnerman.

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[1] The Examiner's rejection states that claims 78-88 are rejected (Ans. 5). Appellant contends the Examiner meant the third rejection to apply to claims 76-88, rather than 78-88 (App. Br. 28). As claim 76 is the sole independent

4. Claims 76 and 83-88 stand rejected under 35 U.S.C. § 103(a) as obvious over Inoue.

5. Claims 77-81 stand rejected under 35 U.S.C. § 103(a) as obvious over Inoue in view of Gunnerman.

6. Claim 82 stands rejected under 35 U.S.C. § 103(a) as obvious over Inoue alone or in view of Gunnerman.

Regarding rejections (1) to (3), we address Appellant's arguments with respect to independent claims 40, 58, and 76 for reasons that will become evident below.

Regarding rejection (4), Appellant argues separately for independent claim 76 (App. Br. 32-35). Appellant asserts claims 83-88 are allowable based on their dependency on claim 76 (App. Br. 35). Therefore, we treat claims 76 and 83-88 as a group to stand or fall together, with claim 76 as representative. 37 C.F.R. § 41.37(c)(1)(vii).

Regarding rejections (5) and (6), Appellant argues for the allowability of claims 77-81, and 82, respectively, based on their dependency on claim 76, as well as collectively arguing for the allowability of the additional limitations in these claims (App. Br. 35-38). Accordingly, dependent claims 77-81, and 82 are treated with regard to the argued features of independent claim 76, respectively.

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claim of this group, the rejection only makes sense if this claim is included. Therefore, we determine that the Examiner's omission of claims 76 and 77 is harmless error and address the third rejection as applied to claims 76-88.

Gunnerman Rejections (1) to (3)

ISSUE

Has Appellant shown the Examiner reversibly erred in concluding that the omission of the aqueous phase (claim 40), omission of the suface active agent (claim 58), or the omission of the oxidizing agent (claim 76) would have been obvious over Gunnerman? We decide this issue in the affirmative.

FINDINGS OF FACT

1. Gunnerman discloses a method of removing organic sulfur compounds from a petroleum-based fuel by a continuous process that applies ultrasound to a multiphase reaction medium that contains the fuel, an aqueous fluid, a hydroperoxide oxidizing agent and a surface active agent. The reaction medium spontaneously separates into organic and aqueous phases after ultrasonic treatment (col. 2, ll. 27-35).
2. Gunnerman states that it is believed that the sulfides in the fuel are converted by the oxidation process to the corresponding sulfones, which have greater solubility in the aqueous phase and therefore are more readily removable by the separation of the phases (col. 3, ll. 1-5).
3. Gunnerman states that the process can produce improved fuels. The process may increase the ignition performance, the cetane number and the API gravity of fuels, such as diesel fuels (col. 3, l. 58 – col. 4, l. 10). Gunnerman does not explain or

hypothesize on the means by which these improvements occur, or the function of the aqueous fluid, surface active agent oxidizing agent or the subsequent phase separation in achieving these other improvements.

4. Gunnerman teaches the surface active agent may be any that promotes the formation of an emulsion between the aqueous and fuel fluids upon passing through a mixing pump and that will spontaneously separate the product liquid into organic and aqueous phases suitable for separation by a decanter (col. 4, ll. 61-67). Gunnerman discloses that the surface active agent is chosen to effect spontaneous separation of the emulsion into aqueous and organic phases upon exiting from the ultrasound chamber (col. 8, ll. 1-14).

PRINCIPLES OF LAW

In patentability context, claims are to be given their broadest reasonable interpretation. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

"It can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

A modification to the prior art which renders it inoperable for its intended purpose effectively teaches away from the modification. *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984).

ANALYSIS

Appellant contends removal of the aqueous phase, surface active agent, or oxidizing agent from Gunnerman would not have been obvious because the aqueous phase, surface active agent and oxidizing agent are necessary for the intended function of removing the sulfur products, and the prior art relied on evinces that implementing any of these omissions would render the method unsuitable for its intended purpose (i.e., separating sulfur from fuel via an oxidation reaction with an aqueous phase emulsion) (App. Br. 21-22, 25, 31).

Gunnerman teaches a method of removing or extracting sulfur compounds from a petroleum-derived fuel by mixing the fuel with water, a surface-active agent and an oxidizing agent, to form an emulsion. The emulsion is then placed in a vessel and sonic energy is applied to the emulsion (FF 1). During application of the sonic energy, the sulfur contaminants in the fuel are oxidized to what are believed to be more water-soluble compounds, which move into the aqueous phase of the emulsion (FF 2). The oxidized sulfur compounds are removed from the fuel when the organic and aqueous phases are separated.

The Examiner found the difference between Gunnerman and the invention of claims 40, 58, and 76 was that Gunnerman did not teach a process with the absence of an aqueous phase, surface active agent, or an oxidizing agent (Ans. 3-5). The Examiner then concluded, if the function of the aqueous phase, surface active agent, or oxidizing agent was undesired, its omission would have been obvious, citing *Ex Parte Wu*, 10 USPQ2d 2031, 2032 (BPAI 1989), *In re Larson*, 340 F.2d 965, 969 (CCPA 1965) and *In re Kuhle*, 526 F.2d 553, 555 (CCPA 1975) (Id.).

The Examiner contends the separation would still occur even without an aqueous phase, surface active agent, or oxidizing agent, but not as easily or readily as would occur with a mixture having such components (Ans. 7-9). The Examiner concludes the aqueous phase, surface active agent, or oxidizing agent is only to improve the effectiveness and efficiency of the process (Id).

We do not find the Examiner's reasoning persuasive. In maintaining a rejection under §103, some reason should be articulated for why a skilled artisan would have found the suggested difference from the prior art obvious. *KSR,* 550 U.S. at 418. We cannot determine any reason why one skilled in the art would have omitted the aqueous phase, surface active agent, or oxidizing agent from Gunnerman's process.

Throughout Gunnerman, the process is described as involving a multiphase, organic/aqueous emulsion which is subsequently separated or allowed to separate, the undesired contaminants being extracted by the aqueous phase (FF 1, 2). The Examiner asserts the separation would still occur without the aqueous phase (Ans. 7), but this statement makes no sense based on Gunnerman's disclosure. Rather, Gunnerman describes the separation of the aqueous emulsion into separate organic and aqueous phases (FF 4), and the emulsion was created by the addition of the water (aqueous fluid), assisted by surfactant (surface active agent) to the fuel liquid (organic phase) (Id.). If there is no aqueous fluid, then an aqueous/organic phase emulsion could not form. Gunnerman only describes the separation of the emulsion, which resulted from the added aqueous fluid. To assert the aqueous phase is undesirable is merely using Appellant's Specification in hindsight.

Furthermore, Gunnerman shows the aqueous phase as the means by which the oxidized sulfur contaminants are removed from the organic fuel phase (FF 2). Gunnerman describes no other means by which the oxidized contaminants may be removed. In other words, omission of the aqueous layer would have rendered the process unsuitable for its intended purpose. *Gordon*, 733 F.2d at 902.

Regarding the surface active agent, Gunnerman teaches that the surface active agent promotes the formation of the emulsion of the organic and aqueous phases (FF 4). Gunnerman does not teach or suggest any other way of operating the process without the formation of the emulsion. Indeed, Gunnerman teaches selecting the surface active agent to effect a spontaneous separation of the aqueous and organic phases (FF 4). Accordingly, omitting the surface active agent from Gunnerman's process would have rendered the process unsuitable for its intended purpose (i.e., phase separation). *Gordon*, 733 F.2d at 902.

Regarding the oxidizing agent, Gunnerman teaches oxidizing undesirable sulfide compounds in the presence of an oxidizing agent and sonic energy (FF 1). Gunnerman does not teach or suggest oxidizing or otherwise eliminating the undesirable sulfide compounds by any other means absent the oxidizing compound. We agree with Appellant that omission of the oxidizing agent would render the Gunnerman process unsuitable for its intended purpose (i.e., oxidation of sulfides). *Gordon*, 733 F.2d at 902.

We therefore conclude that in view of the prior art, one skilled in the art would not have found operating the process of Gunnerman in the absence of an aqueous phase, surface active agent, or oxidizing agent obvious.

Accordingly, we decide the issue affirmatively. The rejection of claims 40-88 under §103 over Gunnerman is not sustained.

Inoue Rejections

ISSUES

1. Has Appellant shown the Examiner reversibly erred in concluding that it would have been obvious to include a heating step with the Inoue process as required by claim 76? We decide this issue in the negative.

2. Has Appellant shown the Examiner reversibly erred in concluding that operating a process comprising the step of heating said crude oil in the absence of an oxidizing agent as required by dependent claims 77 and 82 would have been obvious over Inoue in view of Gunnerman? We decide this issue in the negative.

ADDITIONAL FACTUAL FINDINGS (FF)

We rely on the factual findings noted above in addition to those indicated below.

5. Inoue discloses a method for extracting sulfur and sulfur compounds from liquid petroleum products (col. 1, ll. 5-10). The method uses certain high-energy (radiant or vibrational) sources to treat the sulfur-containing liquid without substantial heating thereof (col. 1, ll. 56-59). The high-energy sources may include an electric spark discharge (col. 2, ll. 34-36), a laser (col. 2, ll. 44-46) or sonic or shock generators (col. 2, ll. 56-58).

6. Inoue states that, regarding processes to reduce the sulfur content of crude and fuel oils, thermal treatments are expensive and may modify the composition of the oil if carried out extensively. It had not been economically feasible to treat oil previously in large volumes (col. 1, ll. 32-38).
7. Inoue states "in spite of use of high energy discharge, it has been found to be possible to keep the heating of the liquid at a minimum so that the reaction effectively takes place at ambient temperature" (col. 2, ll. 31-33).

PRINCIPLES OF LAW

We rely on the same principles set-forth above as well as the following case law.

A reference that teaches away cannot serve to create a prima facie case of obviousness. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). A reference may be said to teach away "when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *Id.* "The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." *Id.*

ANALYSIS

Issue (1): Heating Step

The Examiner found Inoue does not disclose that the feed is heated while exposing the crude oil fraction to sonic energy. But, the Examiner concluded it would have been obvious to modify the process by heating the crude oil a couple of degrees because one would expect the results would be the same or similar when operating the process at ambient temperature or slightly higher (Ans. 5).

Appellant contends Inoue does not teach heating the feed, but merely describes a method of exposing petroleum liquids to high-energy sources without substantially heating the liquids (App. Br. 33 [emphasis in original]). Appellant further contends Inoue teaches away from heating, when its states "thermal treatments are expensive and may, if carried out extensively, severely modify the composition of the oil." (App. Br. 34, *see* FF 6).

In construing a claim, we are required to give the terms of the claims their broadest reasonable interpretation. *Van Geuns*, 988 F.2d at 1184. The relevant portion of claim 76 reads "comprising the step of heating said crude oil fraction." It is not limited to any minimal amount of heating. Therefore any amount of heating, including Inoue's insubstantial heating caused by the high energy discharge sources (*see* FF 7), would be encompassed by the claim.

We further disagree that Inoue teaches away from heating. It only teaches that thermal treatment may be expensive (FF 6). Inoue does not

discourage minimal heating that would be included in the claim as noted above. Indeed, Inoue discloses minimal or insubstantial heating (FF 7).

Accordingly, we decide the first issue negatively, and the § 103 rejection of claims 76 and 83-88 over Inoue is sustained.

Issue (2)

Appellant contends Inoue together with Gunnerman does not teach the features of heating said crude oil fraction in the absence of an oxidizing agent (App. Br. 35-40).

However, Appellant's argument does not address the Examiner's stated rejection that combined Gunnerman's petroleum feedstock and processing residence times with Inoue's process of treating petroleum feed using high energy sources (Ans. 6). The Examiner's rejection relies on Gunnerman for the feedstock and residence times only, which plainly indicates that the Examiner relies on Inoue, the primary reference, to teach heating without an oxidizing agent. In other words, Appellants have not shown reversible error in the Examiner's finding that Inoue teaches the disputed features. Thus, the Examiner's combination of Gunnerman with Inoue for establishing the obviousness of employing a workable residence time and/or particular petroleum feedstock, consonant with Appellant's claimed requirements, in Inoue's process has not been confronted, much more shown to represent reversible error, by Appellant's arguments.

Accordingly, we answer the first and second issues negatively, and the rejections of claims 77-82 over Inoue in view of Gunnerman are sustained.

DECISION

The rejections of claims 40-88 under §103(a) over Gunnerman, alone, are REVERSED.

The rejection of claims 76, and 83-88 under §103(a) over Inoue in view of Gunnerman is AFFIRMED.

The rejection of claims 77-82 under §103(a) over Inoue in view of Gunnerman is AFFIRMED.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

PL initial:
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